

AMI Use Case:

C2 - Customer has access to recent energy usage and cost at their site

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Document History

Revision History

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Approvals

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1. Use Case Description

1.1 Use Case Title

Customer has access to recent energy usage and cost at their site .

1.2 Use Case Summary

Customers are becoming aware of the importance of understanding how much energy they are using and when it is being used. Customers want to understand how their energy consumption habits affect their monthly energy bills and to find ways to reduce their monthly energy costs. The utility and regulatory agencies also want customers to be aware of the energy they are consuming and associated costs. By providing customers better visibility to their energy usage and cost at their site, they can make more educated energy related decisions regarding participation in load reduction programs, be more inclined to install energy efficient equipment and potentially to change their energy consumption habits. AMI will enable improved communications between the utility and it's customers by making it possible to remotely transmit energy usage, cost and energy related utility messages to the AMI meter and down to the customer's display device within the home or business (if equipped). The types of messages the utility may send include energy conservation alerts or tips, planned outage information and other energy related information.

In this use case we will determine what AMI enabled equipment and technology (e.g., meter, communication systems and data storage) will be necessary to support our customers need to manage their energy consumption and costs including the types of data (usage, costs, messages), data refresh frequency, interval length and data access mechanisms.

1.3 Use Case Detailed Narrative

The customer accesses their most recent usage and pricing data via their meter or display device to determine how much energy they are using and the associated costs at their site. Then the customer may reduce their usage by raising their A/C thermostat, which cycles off their cooling mode. The customer then views the results of the change in their energy consumption, displayed in energy usage and cost data on their meter or in home/business display device (if equipped and it meets the utility requirements).

The customer then may want to view their historical energy usage data from the previous day. The customer logs onto a utility website, selects an account and requests the usage period for the previous day. The usage data is displayed on the website for the customer to view. The customer then requests cost data to display for the same period. The cost information displays on the website. The customer views the information then logs off the website.

1.4 Business Rules and Assumptions

Describe any business rules, assumptions and regulatory or policy constraints that apply to this use case

- On cycle billing will continue to be monthly
- Customers will have real-time access to usage/cost data
- Interval usage, cost, and pricing data will be available on a utility website (e.g., sce.com)
- In this use case the assumption is that the AMI meter will act as the gateway between the utility and the customer's device(s) (if equipped)

2. Actors

<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Customer Display Device	Device	This device shall be located at the customer site and be able to receive usage, cost, text messages, etc. from the utility (e.g via the meter or ADCS). The device must meet SCE requirements (for communication to the AMI system) to enable this ability.
Meter Data Management System (MDMS)	System	System that stores meter data (e.g. usage, generation, meter logs) and makes data available to authorized systems. This system interfaces with the AMI system
Customer	Person	Customer of record at the meter location who receives electric service from SCE.
Automated Data Collection System (ADCS)	System	System that can communicate with AMI meters remotely (e.g. program meters, test meters, retrieve data). This system is a component of the AMI system)
AMI	System	The AMI system is made up of systems that are required to enable remote two-way communications with meters and data storage (e.g. ADCS).
Customer Service System (CSS)	System	System that stores customer and site specific information (e.g. rate, meter, customer contact info), usage data, etc. This system calculates and generates customer bills and tracks collection activity.
AMI Meter	Device	Device that receives, records, displays and transmits data (e.g. usage, generation, text messages, event logs, etc.) to authorized systems (e.g. ADCS) and provides other advanced utility functions, (e.g. cost calculations)
Customer Communication System (CCS)	System	System that enables SCE employees to send remote communications to the customer (meter or display devices)
Customer Representative	Person	Person who works in the utility call center to answer customer calls.
Website	System	A utility provided internet site where the customer can view their energy and cost information online (e.g., sce.com).
Customer Device	Device	Customer devices that the AMI system will transmit energy related information to such as cell phones, satellite or cable station, etc.

3. Step by Step analysis of each Scenario

Describe steps that implement the scenario. The first scenario should be classified as either a “Primary” Scenario or an “Alternate” Scenario by starting the title of the scenario with either the work “Primary” or “Alternate”. A scenario that successfully completes without exception or relying heavily on steps from another scenario should be classified as Primary; all other scenarios should be classified as “Alternate”. If there is more than one scenario (set of steps) that is relevant, make a copy of the following section (all of 3.1, including 3.1.1 and tables) and fill out the additional scenarios.

3.1 Primary Scenario One - The customer views their energy and cost data on the AMI meter and/or display device at their site

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer views their usage and/or generation data on the AMI meter at their site	Customer	Meter must be installed and provisioned	Customer will have viewed data on meter display

3.1.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

Step #	Actor	Description of the Step	Additional Notes
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer views their energy and cost data on the AMI meter at their site	
2	AMI Meter	<p>The meter displays the following information :</p> <p>1. Energy Information</p> <ul style="list-style-type: none"> a. Amount of energy consumed and generated (kWhrs) in the most recent completed interval b. Total energy consumed and generated (kWhrs) within the current bill cycle c. Current consumption demand (kW) and generation demand (kW) (instantaneous watts) d. Peak demand and generation (kW) to date in the current bill cycle and the date/time it occurred e. If the customer is on TOU rate <ul style="list-style-type: none"> i. Energy consumed (kWh) and energy generated (kWh) within current bill cycle in TOU periods (e.g. on, mid, off peak) ii. Peak demands (kW) within the current bill period in TOU periods (e.g on, mid, off peak) f. Instantaneous volt , amps and VARs <p>2. Energy Cost Information (energy cost calculated</p>	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
		<p>using “as read” data only</p> <ul style="list-style-type: none"> a. The energy (kWh) cost for the most recent completed interval b. Total energy (kWh) cost for energy consumed within the current bill cycle c. If the customer is on a TOU rate <ul style="list-style-type: none"> i. Energy (kWh) costs accrued within current bill cycle in TOU periods <p>3. Other Energy Related Information</p> <ul style="list-style-type: none"> a. The customer’s current rate label and when it was last updated (e.g. TOU-GS2, 1/3/06) <ul style="list-style-type: none"> i. The customer’s energy pricing (kWh interval energy price and/or TOU peak kWh price) ii. The bill cycle schedule start and end date (current only) iii. The current date and time (in local time) iv. Utility messages to the customer 	
3	AMI Meter	The meter pushes the energy and cost related information to the customer's display device as it is displayed or received	

3.2 Scenario Description - The customer's display device is provisioned to accept information from the AMI meter/AMI system

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer wants to install a display device and view their energy information.	Customer	Meter must be installed and provisioned	Customer is able to view their energy information on their display device

3.2.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer contacts the utility or logs onto a utility website to provision their new display device	
2	Customer	The customer provides their account information and display device ID	
3	Customer Representative/Website	The Customer Representative accesses the customer's account and meter information in the CSS	
4	Customer Representative/Website	The Customer Representative confirms the customer device meets SCE requirements	
5	Customer Representative/Website	The Customer Representative sends a request to provision the AMI meter to enable transmission of energy and cost information to the customer device	
6	ADCS	The ADCS receives the request to provision the meter	
7	ADCS	The ADCS sends the provision message to the meter	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
8	AMI Meter	The meter receives, processes and logs the request	
9	AMI Meter	The meter sends a confirmation back to the ADCS that the request was completed	
10	ADCS	The ADCS receives and logs the confirmation, then notifies CSS that the request is completed	
11	Customer Representative/Website	The Customer Representative views and/or acknowledges the confirmation, then sends a test message to the meter using the CCS	
12	AMI Meter	The meter receives and logs the test message	
13	AMI Meter	The meter sends the test message to the customer's display device	
14	Customer Display Device	The display device receives and displays the message	
15	Customer	The customer confirms the message was received.	

3.3 Scenario Description - The customer requests to view energy data (up to the current hour) for their site by internet

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer submits a request to view their energy data up to the current hour via the internet	Customer	Meter must be installed and provisioned	Customer will have viewed their energy data on the internet

3.3.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

Step #	Actor	Description of the Step	Additional Notes
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer logs onto a utility website (e.g., sce.com) and accesses their account	
2	Customer	The customer requests energy data for their current bill cycle up until the current hour for their site 1. Energy Information a. Amount of energy consumed and generated (kWhrs) in the most recent completed interval b. Total energy consumed and generated (kWhrs) within the current bill cycle c. Snapshot of current consumption demand (kW) and generation demand (kW) (instantaneous watts) d. Snapshot of volts, amps and VARs	
3	MDMS	The MDMS receives and logs the message and determines that all the usage data is not available and sends a request to the ADCS	
4	ADCS	The ADCS receives the request and sends a message to the AMI meter to retrieve usage data for the missing intervals and other site information (e.g. demand, volts, amps, VARs)	
5	AMI Meter	The meter receives and logs the message from the ADCS	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
6	AMI Meter	The meter sends the usage data (up to the last completed interval) and other requested information to the ADCS	
7	ADCS	The ADCS receives and logs the usage data and other site data from the meter and sends it to the MDMS	
8	MDMS	The MDMS receives and logs the energy data and sends it to the website (e.g., sce.com)	
9	Website	The website receives and presents the interval usage and other site data to the customer	

3.4 Scenario Description - The customer requests to view cost data (up to the current hour) for their site for by internet

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer submits a request to view their cost data up to the current hour via the internet	Customer	Meter must be installed and provisioned	The customer will have view their cost data (an estimate) up until the current hour

3.4.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

Advanced Metering Infrastructure (AMI) Program C2 - Customer has Access to Recent Energy Usage and Cost at their Site

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer logs onto a utility website (e.g., sce.com) and accesses their account	
2	Customer	The customer requests cost data for their current bill cycle up until the current hour for their site <ul style="list-style-type: none"> • Cost estimation results may include all billing components (e.g. kWh, kW, kVar, etc.) unlike cost data provided on the meter or display device 	
3	MDMS	The MDMS receives and logs the message and determines that all the usage data is not available and sends a request to the ADCS	
4	ADCS	The ADCS receives the request and sends a message to the AMI meter to retrieve usage data for the missing intervals	
5	AMI Meter	The meter receives and logs the message from the ADCS	
6	AMI Meter	The meter sends the usage data (up to the last completed interval) to the ADCS	
7	ADCS	The ADCS receives and logs the usage data from the meter and sends it to the MDMS	
8	MDMS	The MDMS receives and logs the usage data and sends all request interval data to the CSS to for cost calculations	
9	CSS	The CSS receives the usage data and calculates the energy cost for the current bill cycle up to the most recent hour	
10	CSS	The CSS sends the energy cost information to the website (e.g., sce.com)	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
11	Website	The website receives and presents the cost data to the customer	

3.5 Scenario Description - The customer receives real-time messages on the AMI meter and/or in home/business display device

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer wants to view real-time messages on the AMI meter and/or in home/business display device	Customer	Meter must be installed and provisioned	Customer views utility message on their meter and display device

3.5.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>

Advanced Metering Infrastructure (AMI) Program
C2 - Customer has Access to Recent Energy Usage and Cost at their Site

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
1	CCS	<p>The utility sends an informational message to the customer using the (Customer Communication System - CCS):</p> <ul style="list-style-type: none"> • Energy shortage alert • Outage in area • Energy usage warning (notice of high demand or entering next pricing tier) • Rate changes coming soon • Conservation messages • And more.. 	
2	AMI Meter	The meter receives the message from the CCS	
3	AMI Meter	The meter logs the message and sends an acknowledgement to the CCS indicating that the message was received.	
4	AMI Meter	The meter displays the message received from the CCS	
5	AMI Meter	The meter sends the message to the customer's in home/business display	
6	Customer Display Device	The in home/business display device (if present and provisioned) receives the message from the meter	
7	Customer Display Device	The customer views the message on the meter and/or on in home/business display device.	

3.6 Alternate Scenario Description - The customer is not able to view energy usage and/or cost data on the AMI meter display

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The AMI meter determines that the display is not functioning properly	AMI Meter	Meter must be installed and provisioned	The meter display is reset or required systems are notified of the meter problem.

3.6.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	AMI Meter	Prior to the customer calling to report trouble, the meter determines that the meter display is not functioning properly and logs the problem	
2	ADCS	The ADCS retrieves the meter log during the normal daily read schedule and identifies the logged event	
3	ADCS	The ADCS will send a request to reset the meter display	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
4	AMI Meter	The meter will receive, process, and log the meter display reset request	
5	AMI Meter	The meter will send the meter display reset request results to the ADCS	
6	ADCS	The ADCS will receive and log the meter display reset request results	
7	AMI Meter	If meter display test or meter reset process indicates failure, the ADCS will alert other systems (i.e. CSS, trouble order system, etc.)	This scenario is continued in more detail in the more generalized maintenance use case "I2: Utility Manages End-to-End Lifecycle of the Meter System".

3.7 Alternate Scenario Description - The customer is not able to view energy and/or cost data on their display device

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer is not able to view their usage and/or cost data on their display device	Customer	Meter must be installed and provisioned	The meter is re-provisioned and the customer can now view current energy information for the utility

3.7.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

Step #	Actor	Description of the Step	Additional Notes
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer tries to view energy and/or cost data for the current day on their display device (the device must meet SCE requirements)	
2	Customer Display Device	Data on the display has not been updated since the previous day	
3	Customer	The customer calls the utility	
4	Customer Representative	The Customer Representative accesses the customer account information in CSS	
5	Customer Representative	The Customer Representative sends a test message to the AMI meter	
6	CSS	The CCS receives, logs and sends the test message to the meter	
7	AMI Meter	The meter receives and logs the message from the CCS and displays the test message	
8	AMI Meter	The meter sends the test message to the customer's display	
9	Customer	The customer is unable to view the test message	
10	CSR	The Customer Representative sends a request to re-provision the AMI meter to enable transmission of energy and cost information to the customer display device	
11	ADCS	The ADCS receives the request to provision the meter	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
12	ADCS	The ADCS sends the provision message to the meter	
13	AMI Meter	The meter receives, processes and logs the request	
14	AMI Meter	The meter sends a confirmation back to the ADCS that the request was completed	
15	ADCS	The ADCS receives and logs the confirmation, then notifies CSS that the request is completed	
16	Customer Representative	The Customer Representative views the confirmation then sends a test message to the meter	
17	AMI Meter	The meter receives and logs the test message	
18	AMI Meter	The meter sends the test message to the customer's display device	
19	Customer Display Device	The display device receives and displays the message	
20	Customer	The customer confirms the message was received	

3.8 Alternate - Scenario Description - The customer is not able to retrieve usage data for the previous day on the internet

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer requests to view their usage data for the previous day via the internet	Customer	Meter must be installed and provisioned and the customer must be enrolled to view their data on the utility website.	An on-demand read will have determine data missing in the meter and a remote meter test will have provided test results.

3.8.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

Step #	Actor	Description of the Step	Additional Notes
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer tries to view usage data for the previous day using a utility website (e.g., sce.com)	
2	Website	The website attempts to retrieve usage data for the previous day from the MDMS	
3	MDMS	The MDMS searches for usage data	
4	MDMS	The MDMS cannot locate the usage data and sends a request to the ADCS	
5	ADCS	The ADCS initiates an on-demand read for the missing intervals from the meter	
6	AMI Meter	The meter receives and logs the on-demand read request	
7	AMI Meter	The meter does not contain the requested data and sends a message to the ADCS	
8	ADCS	The ADCS receives the message and logs the results and sends a message to the MDMS	
9	MDMS	The MDMS receives the message, logs it and provides notification to the website	
10	Website	The website receives the notification and displays a message to the customer	
11	ADCS	The ADCS then initiates on-demand remote meter test	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
12	AMI Meter	The meter receives and executes the on-demand remote meter test, logs the results, and sends results to the ADCS within 60 seconds	
13	ADCS	The ADCS receives and logs the on-demand remote meter test results	
14	AMI Meter	If the meter failed the test, other required authorized SCE systems are notified (e.g. MDMS, Trouble Order System, etc.)	

3.9 Scenario Description - The meter display is remotely configured according to the customer's request

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer contacts the utility to customize the meter display information	ADCS	Meter must be installed and provisioned	The customer will be able to view their energy information on the AMI meter display

3.9.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer contacts the utility or logs onto a utility website and provides their account information, to customize the information they wish to view on their AMI meter	
2	Customer Representative/Website	The Customer Representative accesses the customer's account and verifies their identity	
3	Customer	The customer advises what they wish to view on their AMI meter (e.g., energy information and energy pricing, but no cost estimation data) or they can have the customized meter display information disabled (except for utility required information).	
4	Customer Representative/Website	The Customer Representative enters the meter display provision information in CSS	
5	CSS	The CSS sends the meter display provision message to the ADCS	
6	ADCS	The ADCS receives and logs the provision message from the CSS and sends the command to the AMI Meter	
7	AMI Meter	The meter receives, logs and processes the request from the ADCS and sends a confirmation to the ADCS	
8	ADCS	The ADCS receives and logs the confirmation and sends the confirmation to the MDMS	
9	MDMS	The MDMS receives and logs the confirmation and makes the information available to other utility systems (e.g., CSS)	

<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
10	Customer Representative/Website	The Customer Representative views and/or acknowledges the confirmation and advises the customer that the request is complete and asks the customer to confirm what they see on the meter display	
11	Customer	The customer confirms the display is correct	

3.10 Scenario Description - The customer requests the utility to send energy usage and pricing information to customer devices (e.g. text messages on cell phone, satellite or cable station, etc.)

<i>Triggering Event</i>	<i>Primary Actor</i>	<i>Pre-Condition</i>	<i>Post-Condition</i>
<i>(Identify the name of the event that start the scenario)</i>	<i>(Identify the actor whose point-of-view is primarily used to describe the steps)</i>	<i>(Identify any pre-conditions or actor states necessary for the scenario to start)</i>	<i>(Identify the post-conditions or significant results required to consider the scenario complete)</i>
The customer submits a request for the utility to send energy usage and pricing information to their cell phone on a routine basis	CCS	The AMI meter is installed and provisioned	Customer will have viewed their energy data on their cell phone

3.10.1 Steps for this scenario

Describe the normal sequence of events that is required to complete the scenario.

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
<i>#</i>	<i>What actor, either primary or secondary is responsible for the activity in this step?</i>	<i>Describe the actions that take place in this step. The step should be described in active, present tense.</i>	<i>Elaborate on any additional description or value of the step to help support the descriptions. Short notes on architecture challenges, etc. may also be noted in this column..</i>
1	Customer	The customer contacts the utility or logs onto a utility website (e.g., sce.com) and provides their account information	
2	Customer	<p>The customer requests to enable energy information to be sent to their cell phone (e.g. daily updates) for their site. The utility will provide specific options that the customer can choose for the frequency and content of the energy information messages. The energy related information may include the following:</p> <p>a. Energy Information</p> <ul style="list-style-type: none"> I. Amount of energy consumed and generated (kWhrs) in the most recent completed interval II. Total energy consumed and generated (kWhrs) within the current bill cycle III. Current consumption demand (kW) and generation demand (kW) (instantaneous watts) IV. Peak demand and generation (kW) to date in the current bill cycle and the date/time it occurred V. If the customer is on TOU rate <ul style="list-style-type: none"> 1. Energy consumed (kWh) and energy generated (kWh) within current bill cycle in TOU periods (e.g. on, mid, off peak) 2. Peak demands (kW) within the current bill period in TOU periods (e.g on, mid, off peak) <p>b. Energy Cost Information (energy cost calculated)</p>	

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
		<p>using “as read” data only</p> <ul style="list-style-type: none"> I. The energy (kWh) cost for the most recent completed interval II. Total energy (kWh) cost for energy consumed within the current bill cycle III. If the customer is on a TOU rate IV. Energy (kWh) costs accrued within current bill cycle in TOU periods <p>c. Other Energy Related Information</p> <ul style="list-style-type: none"> I. The customer’s current rate label and when it was last updated (e.g. TOU-GS2, 1/3/06) II. The customer’s energy pricing (kWh interval energy price and/or TOU peak kWh price) III. The bill cycle schedule start and end date (current only) IV. The current date and time (in local time) V. Utility messages to the customer 	
3	Customer	The customer will enter their cell phone number to identify the destination for where they want their energy information sent each day	
4	Customer Representative/Website	The Customer Representative will confirm the customer's identity (not defined in this use case) and accept the customer's request based on the customer eligibility. The request will then be input into the utility system (e.g. CSS)	
5	CSS	The CSS will receive and log the request.	
6	CSS	The CSS will send a command to the CCS to send a test message to the customer's cell phone.	The customer must confirm they received the test message “before” the utility will begin sending customer confidential information

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<i>Step #</i>	<i>Actor</i>	<i>Description of the Step</i>	<i>Additional Notes</i>
7	CCS	The CCS will receive and log the request for a test message to be sent to the customer's cell phone, then send the test message	
8	Customer Device	The customer's cell will receive the test text message and the customer will confirm their receipt with the utility (e.g. on the website or by calling the utility)	
9	Customer Representative/Website	CSS will be informed that the test text message was received and confirmed by the customer	
10	CSS	The CSS will receive and log the successful test text message was received by the customer	
11	CCS	The CCS begins transmitting daily refreshed energy information to the customer's cell phone from the MDMS	If the customer specified that they want more current than daily refreshed data, refer to Scenario 3, steps 2-8 and Scenario 4, steps 2-10
12	Customer Device	The customer begins receiving daily energy information (as requested) on their cell phone	

4. Requirements

Detail the Functional, Non-functional and Business Requirements generated from the workshop in the tables below. If applicable list the associated use case scenario and step.

4.1 Functional Requirements

<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
The meter shall have pulse output capabilities (same as IDR meters today) to continue providing customers access to their pulse data for their energy management systems and other purposes. This requirement is a minimum but does not limit the meter to other pulse output capabilities as they are developed.	1	0
The meters shall have remote two-way communication abilities with authorized systems and devices.	1 2 3 4 5 6 7 8	0 0 0 0 0 0 0 0
The meter will display the date and time in “local time”, displaying the time in Pacific Daylight Time or Pacific Standard Time as appropriate.	1 2 5 6 7	2 0 0 0 0

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	9	7
The ADCS shall be able to send remote meter display on/or requests to the AMI meter	1 2 5 7 9	2 0 0 0 6
The meter display shall be remotely programmable as on or off , however, a message will appear on the display advising the viewer that the display has been configured as off.	1 2 5 6 7 9	2 0 0 0 0 0
The ADCS shall be able to send remote meter display configuration requests to the AMI meter	1 2 5 7 9	2 0 0 0 6
The meter display shall be remotely configurable to present the amount of gross and/or net energy consumed and generated (kWhrs) in the most recent completed interval	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to present the total gross and/or net energy consumed and generated (kWhrs) within the current bill cycle	1	2

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2 5 7 9	0 0 0 7
The meter display shall be remotely configurable to present the current demand (consumed and generated) in kW, refreshed every 3 seconds	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to present the peak demand (consumed and generated) in kW, recorded to date in the current bill cycle and the date/time it occurred	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to present the energy consumed and generated in kwh, in time-of-use periods, for energy consumed and generated within the current bill	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to present the demand for energy consumed and generated in kW, in time-of-use periods, within the current bill cycle	1 2 5	2 0 0

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	7	0
	9	7
The meter display shall be remotely configurable to present the customer's instantaneous volts, Amps and VARs	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to present the estimated energy cost for consumed and generated energy (kWhrs) in the most recent completed interval	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to present estimated total energy costs for consumed and generated energy (kWhrs) within the current bill cycle	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to present the estimated energy cost for consumed and generated energy in kWhrs, in time-of-use periods, for energy costs accrued within the current bill	1 2 5 7 9	2 0 0 0 7
The meter display shall be remotely configurable to display the customer's current bill cycle schedule (start/end date and number of days)	1	2

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2	0
	5	0
	7	0
	9	7
The meter display shall be remotely configurable to display the customer's current rate schedule (e.g. TOU-GS1)	1	2
	2	0
	5	0
	7	0
	9	7
The ADCS shall be able to transmit customer specific rate information (e.g. kWh pricing, TOU period time frames) to the AMI meter	1	2
	2	0
	5	0
	7	0
The meter shall be able to receive and store rate information (one rate at a time) that is needed to calculate the customer's energy costs (kWh, time-of-use, baseline, etc.) to provide the customer a cost "estimate" and log the date/time the rate information was last updated.	1	2
	2	0
	5	0
	7	0
The meter display shall be remotely configurable to display text information in multiple languages (e.g. English and Spanish). Standard display acronyms such as kWh, kW, etc. shall be displayed in English.	1	2
	2	0
	5	0
	7	0
	9	7
The ADCS shall synchronize customer specific rate information in the meter with the customer's rate information from CSS as applicable (when the tariff for the specific account is updated).	1	2

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2 5 7	0 0 0
The meter display on/off control shall have the ability to be temporarily overridden by onsite authorized SCE employees (e.g. ability to turn on the display for employee viewing) and the meter display will return to it's original state after 10 minutes.	1 2 5 7	2 0 0 0
The meter shall provide the customer the ability to manually scroll through the meter display information.	1 2 5 7	2 0 0 0
The ADCS shall synchronize the bill cycle schedule in the meter with the bill cycle schedule in CSS as applicable (when a bill cycle schedule update occurs).	1 2 3 4 5 6 7 8	0 0 0 0 0 0 0 0
The CCS shall be able to configure and prioritize messages, that are sent to the meter, customer's display devices and other customer designations such as cell phones and satellite/cable stations (the device or location must meet SCE standards)	1 2 11	3 11 11
The meter shall be able to receive, store, log and present text messages received from the CCS or ADCS.	1	2

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2 5 7	0 0 0
The ADCS shall be able to prioritize requests/messages received from authorized systems (configurable).	1 2 3 4 5 6 7 8	0 0 0 0 0 0 0 0
The CCS shall be able to communicate alpha/numeric messages to the meter, customer's display device and other customer destinations such as cell phone or satellite/cable stations (the device and location must meet SCE standards). Text shall be in English or Spanish when applicable.	1 2 11	3 11 11
The CCS shall be able to receive and process requests from other utility systems (e.g. CSS) to send test messages to customer devices (e.g. cell phone, satellite/cable stations, etc.)	11	7
The CCS shall be able to receive and process routine schedule requests from other utility systems (e.g. CSS) to transmit energy related information to customer devices (e.g. display, cell phone, satellite/cable stations, etc.)	11 11	7 11
The MDMS shall receive and store energy related information from utility systems (e.g. ADCS, CSS) and make it available to other utility systems as soon as it is received to other utility systems such as CCS and the utility website. (authority shall be configurable)	3 4 11	8 11 11
The meter shall authenticate messages/requests sources (system or device) prior to processing or displaying such information.	1 2	0 0

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
The meter shall reject and log messages and/or requests that are received from unauthorized systems/devices.	1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
The ACDS shall reject and log messages and/or requests received from unauthorized systems/devices.	1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
The ADCS shall retrieve the meter log each day during the normal daily read schedule, unless otherwise configured.	1	0

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2 3 4 5 6 7 8	0 0 0 0 0 0 0
The meter shall be able to transmit all configurable meter display information to the customer's in home/business display device (the device must meet SCE standards), even if the meter display is turned off	1 2 5 7	3 13 5 8
The meter logs shall include the following information; message/request code, process status, system/device source and/or designation code and date/time received/sent (internal meter clock).	2 2 3 4 5 6 7 7 8 8	8 12 5 5 3 4 13 17 6 12
The ADCS's interval meter data collection and other meter data collection schedules shall be remotely configurable	1 2	0 0

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
The meter shall be able to record the energy consumed and generation data in as little as 5 minute intervals	1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
The meter shall be able to receive, process and log requests for on-demand meter data from the ADCS.	3	5
	3	6
	4	5
	4	6
The recording interval length in the meter shall be remotely configurable by the ADCS and can only be changed at the end of the last completed interval or at time which will ensure that the conversion to the "to" interval length meets billing system requirements (e.g. conversion from 15 min to 60 min occurs at the top of the hour).	1	0
	2	0
	3	0
	4	0
	5	0

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	6	0
	7	0
	8	0
The meter shall be able to retain at least 45 days of 5 minute interval data	1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
The meter shall be able to send acknowledgments to the CCS that informational messages were received and displayed at the meter.	5	3
The meter shall log all CCS informational messages with the date and time the message was received, (Meter's internal clock), message code and source ID.	5	3
The meter shall provide the customer the ability to manually scroll through the most recent 20 messages that were received within the last 24 hours (Rolling 24 hours)	5	3
The meter shall display informational messages with the date and time they were received.	5	3
The meter shall have a visual message waiting indicator.	5	3
The AMI Meter shall display informational messages upon user request	5	3
The AMI Meter shall be able to self diagnose/detect a meter display failure and log the failure. (E.g. No display, illegible text)	6	1
The meter shall make meter diagnostic log information available on-demand or automatically push the information to the ADCS (as configured)	6	2
The ADCS shall have the ability to provision the meter display remotely, according to the utilities	2	7

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<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
command based on the customer's configuration choices.	6	3
The meter shall be able to execute and log remote meter display provision requests.	6 2	4 8
The ADCS shall log the meter display reset request results.	2 6	10 6
The ADCS shall be able to issue an on-demand read request from authorized SCE systems.	3 4 8	4 4 5
The ADCS shall be able to automatically issue a remote meter test upon on-demand read request failure.	8	11
The ADCS shall be able to send an on-demand read failure notification to requesting or configured authorized systems (e.g. MDMS, CSS, Trouble Order System, etc).	8 8	8 14
The ADCS shall be able to alert authorized systems when a meter display problem exists. (e.g. CSS, Field Service System)	8 8	8 14
Energy data (e.g. usage/generation interval data, TOU, etc.) that is presented on the meter display will be "as read" data only and a message should be stated on the display.	1 2 3 4 5 6 7 8	0 0 0 0 0 0 0 0
Cost data that is presented on the meter display shall be accompanied by an "estimate only" message.	1	0

<i>Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0

4.2 Non-functional Requirements

<i>Non-Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
The CCS shall be able to receive and process requests from other utility systems (e.g. CSS) to send test messages to customer devices (e.g. cell phone, satellite/cable stations, etc.) within 60 seconds of the original request.	11	7
The CCS shall be able to routinely (e.g. daily, hourly) transmit energy related information to customer devices (e.g. display, cell phone, satellite/cable stations, etc.) on schedule 99% of the time and 1% of the time within 30 minutes of the original schedule.	11 11	7 11
The meter shall be able to complete remote meter display on/off requests in 60 seconds or sooner of the request time.	1 2 5 6	2 0 0 0

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<i>Non-Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	7	0
	9	7
The meter shall process requests from the ADCS to configure the meter display within 60 seconds	1 2 5 7 9	2 0 0 0 7
The meter shall display the current demand (consumed and generated) in kW, refreshed every 3 seconds	1 2 5 7	2 0 0 0
The meter shall receive, log and update rate specific information received from the ADCS at midnight on the day the rate information is received.	1 2 5 7	2 0 0 0
The meter shall send the ADCS a receipt that it has processed and applied the update rate information in 5 minutes or less of the meter's processing complete time.	1 2 5 7	2 0 0 0
The meter display shall be legible in direct sunlight and darkness	1 2 5 7	2 0 0 0

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<i>Non-Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
The text on the meter display shall be legible from 3 feet away for someone with 20/20 vision.	1 2 5 7	2 0 0 0
The meter shall transmit all configurable meter display information to the customer's display device within 3 seconds from the time the meter recorded the value or received the data.	1 2 5 7 9	2 8 4 13 7
The ADCS shall collect interval data for the previous day (midnight-to-midnight) from all AMI meters by 6 AM each day	1 2 3 4 5 6 7 8	0 0 0 0 0 0 0 0
The ADCS shall be able to collect interval data from AMI meters in the same frequency as the meter's interval length	1 2 3 4 5 6	0 0 0 0 0 0

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<i>Non-Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	7	0
	8	0
The meter's data (e.g. interval data, logs, etc.) push schedule to the ADCS shall be able to be configured down to the meter's interval recording length.	1	0
	2	0
	3	0
	4	0
	5	0
	6	0
	7	0
	8	0
The meter shall receive and log and return results for on-demand meter data (up to 7 days of data) within 60 seconds of the meter receipt	3	5
	3	6
	4	5
	4	6
The meter logs for informational messages shall be able to be store and retain the most recent 20 messages for up to 45 days	2	8
	2	12
	3	5
	4	5
	5	3
	6	4
	7	13
	7	17
	8	6

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<i>Non-Functional Requirements</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
	8	12
The ADCS shall have the ability to provision the meter display remotely and receive confirmation of results within 60 seconds of the request.	6 2 9	4 8 6
The ADCS shall be able to issue and receive results for on-demand read requests from the AMI meter within 60 seconds	3 4 8	5 5 6
The ADCS will process 50,000 (or 1% of the AMI meter population) on-demand requests per day for interval data (not including the pre-scheduled meter data collection schedules) at the customer's request/initiation (e.g. website request).	3 4 8	4 4 5
The AMI system shall successfully deliver energy usage and cost information through designed delivery channels, (meter display, in home display, internet) 99% of the time within 10 seconds (e.g.) and the remaining 1% within 1 minute.	1 2 3 4 5 6 7 8	0 0 0 0 0 0 0 0

4.3 Business Requirements

<i>Business Requirement</i>	<i>Associated Scenario # (if applicable)</i>	<i>Associated Step # (if applicable)</i>
Rate changes for customers must be completed at the end of the bill cycle. This will ensure that the meter does not need to store/track multiple rates (structure and pricing) to calculate customer energy costs at the site.	1 2 3 4 5 6 7 8	0 0 0 0 0 0 0 0

5. Use Case Models (optional)

This section is used by the architecture team to detail information exchange, actor interactions and sequence diagrams

5.1 Information Exchange

For each scenario detail the information exchanged in each step

Scenario #	Step #, Step Name	Information Producer	Information Receiver	Name of information exchanged
#	Name of the step for this scenario.	What actors are primarily responsible for Producing the information?	What actors are primarily responsible for Receiving the information?	Describe the information being exchanged
1		AMI Meter	Customer	Energy Information Energy Cost Information Miscellaneous Information
1		AMI Meter	Customer	Energy Information (i): Amount of energy consumed and generated (kWhrs) in the most recent completed interval
1		AMI Meter	Customer	Energy Information (ii): Total energy consumed and generated (kWhrs) within the current bill cycle
1		AMI Meter	Customer	Energy Information (iii): Current consumption demand (kW) and generation demand (kW) (instantaneous watts)
1		AMI Meter	Customer	Energy Information (iv): Peak demand and generation (kW) to date in the current bill cycle and the date/time it occurred
1		AMI Meter	Customer	Energy Information (v): If the customer is on TOU rate, display (1): Energy consumed (kWh) and energy generated (kWh) within current bill cycle in TOU periods (e.g. on, mid, off peak)
1		AMI Meter	Customer	Energy Information (v): If the customer is on TOU rate, display (2): Peak demands (kW) within the current bill period in TOU periods (e.g on, mid, off peak)
1		AMI Meter	Customer	Energy Information (vi): Instantaneous volts , amps and VARs

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
1		AMI Meter	Customer	Energy Cost Information (as read) (i): The energy (kWh) cost for the most recently completed interval
1		AMI Meter	Customer	Energy Cost Information (as read) (ii): Total energy (kWh) cost for energy consumed within the current billing cycle
1		AMI Meter	Customer	Energy Cost Information (as read) (iii): If the customer is on a TOU rate, display (1): Energy (kWh) costs accrued within current bill cycle in TOU periods
1		AMI Meter	Customer	Other Energy Related Information (i): The customer's current rate label and when it was last updated (e.g. TOU-GS2, 1/3/06)
1		AMI Meter	Customer	Other Energy Related Information (ii): The customer's energy pricing (kWh interval energy price and/or TOU peak kWh price)
1		AMI Meter	Customer	Other Energy Related Information (iii): The bill cycle schedule start and end date (current bill only)
1		AMI Meter	Customer	Other Energy Related Information (iv): The current date and time (in local time)
1		AMI Meter	Customer	Other Energy Related Information (v): Utility messages to the customer (text)
1		AMI Meter	Customer Display	Energy Information (i): Amount of energy consumed and generated (kWhrs) in the most recent completed interval
1		AMI Meter	Customer Display	Energy Information (ii): Total energy consumed and generated (kWhrs) within the current bill cycle
1		AMI Meter	Customer Display	Energy Information (iii): Current consumption demand (kW) and generation demand (kW) (instantaneous watts)
1		AMI Meter	Customer Display	Energy Information (iv): Peak demand and generation (kW) to date in the current bill cycle and the date/time it occurred
1		AMI Meter	Customer Display	Energy Information (v): If the customer is on TOU rate, display (1): Energy consumed (kWh) and energy generated (kWh) within current bill cycle in TOU periods (e.g. on, mid, off peak)
1		AMI Meter	Customer Display	Energy Information (v): If the customer is on TOU rate, display (2): Peak demands (kW) within the current bill period in TOU periods (e.g. on, mid, off peak)
1		AMI Meter	Customer Display	Energy Information (vi): Instantaneous volts , amps and VARs
1		AMI Meter	Customer Display	Energy Cost Information (as read) (i): The energy (kWh) cost for the most recently completed interval

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
1		AMI Meter	Customer Display	Energy Cost Information (as read) (ii): Total energy (kWh) cost for energy consumed within the current billing cycle
1		AMI Meter	Customer Display	Energy Cost Information (as read) (iii): If the customer is on a TOU rate, display (1): Energy (kWh) costs accrued within current bill cycle in TOU periods
1		AMI Meter	Customer Display	Other Energy Related Information (i): The customer's current rate label and when it was last updated (e.g. TOU-GS2, 1/3/06)
1		AMI Meter	Customer Display	Other Energy Related Information (ii): The customer's energy pricing (kWh interval energy price and/or TOU peak kWh price)
1		AMI Meter	Customer Display	Other Energy Related Information (iii): The bill cycle schedule start and end date (current bill only)
1		AMI Meter	Customer Display	Other Energy Related Information (iv): The current date and time (in local time)
1		AMI Meter	Customer Display	Other Energy Related Information (v): Utility messages to the customer (text)
2		Customer	CSR	Customer Service Request <ul style="list-style-type: none"> • Customer Name or Customer Account Number • Type of request = new device connection • Customer Device Identifier • Customer Device Type (must be registered, e.g. UPC)
2		CSR	CSS	Customer Device Approval Query <ul style="list-style-type: none"> • Customer Name or Customer Account Number • New Customer Device Identifier • New Customer Device Type
2	4	CSS	CSR	Customer Device Approval Response <ul style="list-style-type: none"> • Customer Account Number • Meter Identifier • Approval/Disapproval of new customer device
2		CSS	ADCS	Customer Equipment Provisioning Request <ul style="list-style-type: none"> • Meter Identifier • Customer Device Identifier • Provisioning Request Number
2		ADCS	AMI Meter	Customer Equipment Provisioning Message <ul style="list-style-type: none"> • Customer Device Identifier • Provisioning Request Number

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
2		AMI Meter	Customer Display Device	Customer Display Connection Request
2		Customer Display Device	AMI Meter	Customer Display Connection Response
2	=	AMI Meter	ADCS	Customer Equipment Provisioning Confirmation Message <ul style="list-style-type: none"> • Provisioning Request Number
2	=	ADCS	CSS, CSR	Customer Equipment Provisioning Confirmation Message <ul style="list-style-type: none"> • Provisioning Request Number
2		CSS, CSR	AMI Meter	Customer Display Test Message (text)
2		AMI Meter	Customer Display Device	Customer Display Test Message (text)
2		Customer Display Device	Customer	Customer Display Test Message (text)
2		Customer	CSS, CSR	Customer Display Test Confirmation
3, 4		Customer	Website	Website Login Request <ul style="list-style-type: none"> • Customer Name OR Customer Account Number OR Customer User ID • Customer Security Credentials
3		Customer	Website	Website Energy Data Request
3		Website	MDMS	MDMS Individual Customer Usage Request <ul style="list-style-type: none"> • Meter Identifier OR Customer Account Number • Time and Date Range
3		MDMS	ADCS	Individual Customer Usage Subset Request <ul style="list-style-type: none"> • Meter Identifier • Time and Date Range • Specifies subset of WebSite Energy Response
3		ADCS	AMI Meter	Usage Data Request Message <ul style="list-style-type: none"> • Time and Date Range • Specifies subset of WebSite Energy Response
3		AMI Meter	ADCS	Usage Data Response Message <ul style="list-style-type: none"> • Subset of Website Energy Response

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
3		ADCS	MDMS	Individual Customer Usage Subset Response <ul style="list-style-type: none"> • Meter Identifier • Subset of Website Energy Response
3		MDMS	Website	MDMS Individual Customer Usage Response <ul style="list-style-type: none"> • Subset of Website Energy Response
3	9	Website	Customer	Website Energy Response – for a single user: <ul style="list-style-type: none"> • Customer Account Number • Amount of energy consumed and generated (kWhrs) in the most recent completed interval • Total energy consumed and generated (kWhrs) within the current bill cycle • Snapshot of current consumption demand (kW) and generation demand (kW) (instantaneous watts) • Snapshot of volts, amps and VARs
4		Customer	Website	Website Energy Cost Request
4		Website	MDMS	Individual Customer Cost Request <ul style="list-style-type: none"> • Account Number • Start/End Time
4		MDMS	ADCS	Individual Customer Usage Subset Request <ul style="list-style-type: none"> • Customer Name or Account Number • Meter Identifier? • Start/End Time
4		ADCS	AMI Meter	Usage Data Request Message
4		AMI Meter	ADCS	Usage Data Response Message
4		ADCS	MDMS	Individual Customer Usage Subset Response

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
4		MDMS	CSS	Individual Customer Cost Calculation Request <ul style="list-style-type: none"> • Account Number • Meter ID(s) • Interval Data
4		CSS	Website	Individual Customer Cost Response <ul style="list-style-type: none"> • Cost estimation results may include all billing components (e.g. kWh, kW, kVar, etc.) unlike cost data provided on the meter or display device • cost data for their current bill cycle up until the current hour for their site
4	11	Website	Customer	Customer Cost Display <ul style="list-style-type: none"> • Display of Individual Customer Cost Response
5		CCS	AMI Meter	Customer Notification Message. May be one of: <ul style="list-style-type: none"> • Energy shortage alert • Outage in area • Energy usage warning (notice of high demand or entering next pricing tier) • Rate changes coming soon • Conservation messages • And more...
5		AMI Meter	CSS	Customer Notification Acknowledgement <ul style="list-style-type: none"> • Identifies the original Customer Notification Message
5		AMI Meter	Customer Display Device	Customer Notification Display <ul style="list-style-type: none"> • As in the Customer Notification Message

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
5		Customer Display Device	Customer	Customer Notification Display <ul style="list-style-type: none"> As in the Customer Notification Message
6		AMI Meter	ADCS	Meter Event Log <ul style="list-style-type: none"> Transferred in normal daily read Contains an event indicating that the meter display has failed.
6		ADCS	AMI Meter	Meter Display Reset Request Message
6		AMI Meter	ADCS	Meter Display Reset Results Message <ul style="list-style-type: none"> Success or failure Date/Time of complete (meters internal clock) Meter ID Meter reset code (unique request identifier)
6		ADCS	CSS, Trouble Order System, Meter Management System	Equipment Failure Report <ul style="list-style-type: none"> Indicates failure of meter diagnostics
7		Customer	CSR	Customer Trouble Call
7		CSS	AMI Meter	Customer Display Test Message (text)
7		AMI Meter	Customer	Customer Display Test Message (text)
7		AMI Meter	Customer Display	Customer Display Test Message (text)
7		CSR	ADCS	Customer Equipment Provisioning Request
7		ADCS	AMI Meter	Customer Equipment Provisioning Message
7		AMI Meter	Customer Display Device	Customer Display Connection Request
7		Customer Display Device	AMI Meter	Customer Display Connection Response

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<i>Scenario #</i>	<i>Step #, Step Name</i>	<i>Information Producer</i>	<i>Information Receiver</i>	<i>Name of information exchanged</i>
7		AMI Meter	ADCS	Customer Equipment Provisioning Confirmation Message
7		ADCS	CSS	Customer Equipment Provisioning Confirmation Message
7		CSS	AMI Meter	Customer Display Test Message (text)
7		AMI Meter	Customer Display Device	Customer Display Test Message (text)
7		Customer Display Device	Customer	Customer Display Test Message (text)
7		Customer	CSR	Customer Call
8	2	Website	MDMS	MDMS Individual Customer Usage Request
8		MDMS	ADCS	Individual Customer Usage Subset Request
8		ADCS	AMI Meter	Usage Data Request Message
8		AMI Meter	ADCS	Usage Data Unavailable Message
8		ADCS	MDMS	Usage Data Unavailable Message
8		MDMS	Website	Usage Data Unavailable Message
8	10	Website	Customer	Website Data Unavailable Message
8		ADCS	AMI Meter	Meter Self-Test Request
8		AMI Meter	ADCS	Meter Self-Test Response
8		ADCS	CSS, Trouble Order System, Meter Management System	Equipment Failure Report

5.2 Diagrams

The architecture team shall use this section to develop an interaction diagram that graphically describes the step-by-step actor-system interactions for all scenarios. The diagrams shall use standard UML notation. Additionally, sequence diagrams may be developed to help describe complex event flows.

6. Use Case Issues

Capture any issues with the use case. Specifically, these are issues that are not resolved and help the use case reader understand the constraints or unresolved factors that have an impact of the use case scenarios and their realization.

<i>Issue</i>
<i>Describe the issue as well as any potential impacts to the use case.</i>

7. Glossary

Insert the terms and definitions relevant to this use case. Please ensure that any glossary item added to this list should be included in the global glossary to ensure consistency between use cases.

Glossary	
Term	Definition

8. References

Reference any prior work (intellectual property of companies or individuals) used in the preparation of this use case.

9. Bibliography (optional)

Provide a list of related reading, standards, etc. that the use case reader may find helpful.